

SEQUENCE LISTING

<110> CASTANIA Sociedade Agroflorestal SA

<120> Castanea sativa Mill. genes codifying for Allene Oxide Cyclase, Cystatin, B-1,3-Glucanase and Thaumatin-Like Protein and their use

<130> 2004/01/PCT

<141> 2004-06-07

<150> PT 102979-S

<151> 2003-06-26

<160> 8

<170> PatentIn version 3.1

<210> 1

<211> 735

<212> DNA

<213> Castanea sativa

<400> 1

atg gcc act gtt tcc tca gcc tct gct gct ctt aga acc att tct tct 48
Met Ala Thr Val Ser Ser Ala Ser Ala Ala Leu Arg Thr Ile Ser Ser
1 5 10 15

tcc tca tcc aag cta tct tct gcc ttc caa act aaa aag atc caa tct 96
Ser Ser Ser Lys Leu Ser Ser Ala Phe Gln Thr Lys Lys Ile Gln Ser
20 25 30

ttt aaa cta cct aac cct ctc att tct cag aat cat aaa ctt act acc 144
Phe Lys Leu Pro Asn Pro Leu Ile Ser Gln Asn His Lys Leu Thr Thr
35 40 45

acc tct act act gct tcc aga tca ttt tcc tgc aag agc cag agc acc 192
Thr Ser Thr Thr Ala Ser Arg Ser Phe Ser Cys Lys Ser Gln Ser Thr
50 55 60

tca aca gat tca act aac act gaa gtt caa gaa ctt agt gtc tat gag 240
Ser Thr Asp Ser Thr Asn Thr Glu Val Gln Glu Leu Ser Val Tyr Glu
65 70 75 80

atc aat gaa cgt gat cgt gga agc cct gct tat ctt cga ttg agc caa 288
 Ile Asn Glu Arg Asp Arg Gly Ser Pro Ala Tyr Leu Arg Leu Ser Gln
 85 90 95

aag act gtt aat tca ctc gga gat ctt gtc ccc ttt agc aac aag cta 336
 Lys Thr Val Asn Ser Leu Gly Asp Leu Val Pro Phe Ser Asn Lys Leu
 100 105 110

tat act gca gat cta aag aag aga att gga ata aca gca gga ctc tgc 384
 Tyr Thr Ala Asp Leu Lys Lys Arg Ile Gly Ile Thr Ala Gly Leu Cys
 115 120 125

att ctg atc aag cac gaa gaa gag aag aaa gga gat cgc tat gaa gct 432
 Ile Leu Ile Lys His Glu Glu Glu Lys Lys Gly Asp Arg Tyr Glu Ala
 130 135 140

gtt tac agc ttc tac ttc ggc gat tac ggt cat atc gcc gtt cag gga 480
 Val Tyr Ser Phe Tyr Phe Gly Asp Tyr Gly His Ile Ala Val Gln Gly
 145 150 155 160

gcg tac tta acc tat gaa gaa act tac cta gcc gtc acc ggt gga tcc 528
 Ala Tyr Leu Thr Tyr Glu Glu Thr Tyr Leu Ala Val Thr Gly Gly Ser
 165 170 175

ggc ata ttt gca ggg gtt tcc ggt caa gtg aaa ttg cag caa ctc att 576
 Gly Ile Phe Ala Gly Val Ser Gly Gln Val Lys Leu Gln Gln Leu Ile
 180 185 190

ttc cct ttc aag cta ttt tac act ttt tac ttg aag ggg atc ccc ggt 624
 Phe Pro Phe Lys Leu Phe Tyr Thr Phe Tyr Leu Lys Gly Ile Pro Gly
 195 200 205

ctg cca tct gaa ttg ttg tgt acg gcg gtt cct ccg tcg ccg acg gtg 672
 Leu Pro Ser Glu Leu Leu Cys Thr Ala Val Pro Pro Ser Pro Thr Val
 210 215 220

gag cca aca cct gaa gct aaa gct tgt gag gaa ggg gcc gca ctg aaa 720
 Glu Pro Thr Pro Glu Ala Lys Ala Cys Glu Glu Gly Ala Ala Leu Lys
 225 230 235 240

aat tac act aat taa 735
 Asn Tyr Thr Asn

<210> 2

<211> 244

<212> PRT

<213> *Castanea sativa*

<400> 2

Met Ala Thr Val Ser Ser Ala Ser Ala Ala Leu Arg Thr Ile Ser Ser
1 5 10 15

Ser Ser Ser Lys Leu Ser Ser Ala Phe Gln Thr Lys Lys Ile Gln Ser
20 25 30

Phe Lys Leu Pro Asn Pro Leu Ile Ser Gln Asn His Lys Leu Thr Thr
35 40 45

Thr Ser Thr Thr Ala Ser Arg Ser Phe Ser Cys Lys Ser Gln Ser Thr
50 55 60

Ser Thr Asp Ser Thr Asn Thr Glu Val Gln Glu Leu Ser Val Tyr Glu
65 70 75 80

Ile Asn Glu Arg Asp Arg Gly Ser Pro Ala Tyr Leu Arg Leu Ser Gln
85 90 95

Lys Thr Val Asn Ser Leu Gly Asp Leu Val Pro Phe Ser Asn Lys Leu
100 105 110

Tyr Thr Ala Asp Leu Lys Lys Arg Ile Gly Ile Thr Ala Gly Leu Cys
115 120 125

Ile Leu Ile Lys His Glu Glu Glu Lys Lys Gly Asp Arg Tyr Glu Ala
130 135 140

Val Tyr Ser Phe Tyr Phe Gly Asp Tyr Gly His Ile Ala Val Gln Gly
145 150 155 160

Ala Tyr Leu Thr Tyr Glu Glu Thr Tyr Leu Ala Val Thr Gly Gly Ser
165 170 175

Gly Ile Phe Ala Gly Val Ser Gly Gln Val Lys Leu Gln Gln Leu Ile
 180 185 190

Phe Pro Phe Lys Leu Phe Tyr Thr Phe Tyr Leu Lys Gly Ile Pro Gly
 195 200 205

Leu Pro Ser Glu Leu Leu Cys Thr Ala Val Pro Pro Ser Pro Thr Val
 210 215 220

Glu Pro Thr Pro Glu Ala Lys Ala Cys Glu Glu Gly Ala Ala Leu Lys
 225 230 235 240

Asn Tyr Thr Asn

<210> 3

<211> 318

<212> DNA

<213> Castanea sativa

<400> 3

atg aga aaa ttg gca gca cta gtt gga gga gtg tca gat gtt aag gga 48
 Met Arg Lys Leu Ala Ala Leu Val Gly Gly Val Ser Asp Val Lys Gly
 1 5 10 15

cat gag aac agc ttg cag atc gac gac ctc gct cgt ttt gct gtc gac 96
 His Glu Asn Ser Leu Gln Ile Asp Asp Leu Ala Arg Phe Ala Val Asp
 20 25 30

gac cac aac aag aaa gcg aat aca ctg ctg cag ttt aag aag gtg gtg 144
 Asp His Asn Lys Lys Ala Asn Thr Leu Leu Gln Phe Lys Lys Val Val
 35 40 45

aat gcg aaa cag cag gtg gtt tct gga aca ata tac att cta acg ttg 192
 Asn Ala Lys Gln Gln Val Val Ser Gly Thr Ile Tyr Ile Leu Thr Leu
 50 55 60

gag gtg gag gat ggc ggg aag aag aaa gtt tat gaa gcc aag att tgg 240
 Glu Val Glu Asp Gly Gly Lys Lys Lys Val Tyr Glu Ala Lys Ile Trp
 65 70 75 80

gag aag cca tgg ttg aac ttc aag gag gtg cag gaa ttt aag ctc att 288
 Glu Lys Pro Trp Leu Asn Phe Lys Glu Val Gln Glu Phe Lys Leu Ile
 85 90 95

ggt gat gcc cct aca cac cat agt gct taa 318
 Gly Asp Ala Pro Thr His His Ser Ala
 100 105

<210> 4

<211> 105

<212> PRT

<213> *Castanea sativa*

<400> 4

Met Arg Lys Leu Ala Ala Leu Val Gly Gly Val Ser Asp Val Lys Gly
 1 5 10 15

His Glu Asn Ser Leu Gln Ile Asp Asp Leu Ala Arg Phe Ala Val Asp
 20 25 30

Asp His Asn Lys Lys Ala Asn Thr Leu Leu Gln Phe Lys Lys Val Val
 35 40 45

Asn Ala Lys Gln Gln Val Val Ser Gly Thr Ile Tyr Ile Leu Thr Leu
 50 55 60

Glu Val Glu Asp Gly Gly Lys Lys Lys Val Tyr Glu Ala Lys Ile Trp
 65 70 75 80

Glu Lys Pro Trp Leu Asn Phe Lys Glu Val Gln Glu Phe Lys Leu Ile
 85 90 95

Gly Asp Ala Pro Thr His His Ser Ala

100

105

<210> 5

<211> 927

<212> DNA

<213> *Castanea sativa*

<400> 5

atg aga atc tat gat ccg aat cag gct gtt cta caa gcc ctt aga ggc 48
 Met Arg Ile Tyr Asp Pro Asn Gln Ala Val Leu Gln Ala Leu Arg Gly
 1 5 10 15

tct aac att gaa gtc atg cta ggt gtc cca aac tca gac ctt caa agc 96
 Ser Asn Ile Glu Val Met Leu Gly Val Pro Asn Ser Asp Leu Gln Ser
 20 25 30

ctt gcc aac cct tcc aat gca caa gca tgg gta caa aga aac gta ctt 144
 Leu Ala Asn Pro Ser Asn Ala Gln Ala Trp Val Gln Arg Asn Val Leu
 35 40 45

aac ttc tgg cct agt gtc agg ttt cga tac att gca gtt gga aat gaa 192
 Asn Phe Trp Pro Ser Val Arg Phe Arg Tyr Ile Ala Val Gly Asn Glu
 50 55 60

gtg agt cct gtt aat gga ggc aca gct ggg tta gca caa att gtt ctc 240
 Val Ser Pro Val Asn Gly Gly Thr Ala Gly Leu Ala Gln Ile Val Leu
 65 70 75 80

cct gcc tta acc aac gta ttc aat gca att aga tca gct ggc ctt aag 288
 Pro Ala Leu Thr Asn Val Phe Asn Ala Ile Arg Ser Ala Gly Leu Lys
 85 90 95

gac caa atc cag gtt tca att gca att gac atg acc tta ata gga aac 336
 Asp Gln Ile Gln Val Ser Ile Ala Ile Asp Met Thr Leu Ile Gly Asn
 100 105 110

tcc tat cct ccg tca gca ggg gct ttc aga ggt gat gtt aga tca tat 384
 Ser Tyr Pro Pro Ser Ala Gly Ala Phe Arg Gly Asp Val Arg Ser Tyr
 115 120 125

tta gac cca atc att ggt cac cta gta tat gct aag gca ccc tta cta 432
 Leu Asp Pro Ile Ile Gly His Leu Val Tyr Ala Lys Ala Pro Leu Leu

[illegible]

<211> 308

<212> PRT

<213> *Castanea sativa*

<400> 6

Met Arg Ile Tyr Asp Pro Asn Gln Ala Val Leu Gln Ala Leu Arg Gly
1 5 10 15

Ser Asn Ile Glu Val Met Leu Gly Val Pro Asn Ser Asp Leu Gln Ser
20 25 30

Leu Ala Asn Pro Ser Asn Ala Gln Ala Trp Val Gln Arg Asn Val Leu
35 40 45

Asn Phe Trp Pro Ser Val Arg Phe Arg Tyr Ile Ala Val Gly Asn Glu
50 55 60

Val Ser Pro Val Asn Gly Gly Thr Ala Gly Leu Ala Gln Ile Val Leu
65 70 75 80

Pro Ala Leu Thr Asn Val Phe Asn Ala Ile Arg Ser Ala Gly Leu Lys
85 90 95

Asp Gln Ile Gln Val Ser Ile Ala Ile Asp Met Thr Leu Ile Gly Asn
100 105 110

Ser Tyr Pro Pro Ser Ala Gly Ala Phe Arg Gly Asp Val Arg Ser Tyr
115 120 125

Leu Asp Pro Ile Ile Gly His Leu Val Tyr Ala Lys Ala Pro Leu Leu
130 135 140

Ala Asn Val Tyr Thr Tyr Phe Ser Tyr Ala Gly Asn Pro Arg Asp Ile
145 150 155 160

Ser Leu Pro Tyr Ala Leu Phe Thr Ser Pro Ser Val Val Ala Trp Asp
165 170 175

Gly Pro Lys Gly Tyr Gln Asn Leu Phe Asp Ala Met Met Asp Ala Leu
180 185 190

Tyr Ser Ala Leu Glu Arg Ser Trp Gly Gly Ser Leu Glu Val Val Val
195 200 205

Ser Glu Ser Gly Trp Pro Ser Ala Ala Gly Gly Phe Ala Thr Ser Phe
210 215 220

Asp Asn Ala Arg Thr Tyr Tyr Ser Asn Leu Ile Lys His Val Lys Gly
225 230 235 240

Gly Thr Pro Lys Arg Pro Gly Gly Ala Ile Glu Thr Tyr Leu Phe Ala
245 250 255

Met Phe Asn Glu Asn Gln Lys Gln Pro Glu Leu Glu Lys Asn Phe Gly
260 265 270

Leu Phe Phe Pro Asn Lys Gln Pro Lys Phe Asn Leu Asn Phe Gly Gly
275 280 285

Glu Arg Ile Trp Asp Val Thr Ala Glu Tyr Asn Ala Thr Val Ser Leu
290 295 300

Ser Ser Asp Met
305

<210> 7

<211> 732

<212> DNA

<213> *Castanea sativa*

<400> 7

atg aaa acc ctg gca ctc tac ggc ctt acc ttg gcc ttc ttt ttc tta 48
 Met Lys Thr Leu Ala Leu Tyr Gly Leu Thr Leu Ala Phe Phe Phe Leu
 1 5 10 15

tct ggt gca cac tct gct aaa ata act ttc aca aac aac tgt cca aga 96
 Ser Gly Ala His Ser Ala Lys Ile Thr Phe Thr Asn Asn Cys Pro Arg
 20 25 30

acc atc tgg cca gga acc cta act tcg gat caa aaa cct caa ctt tca 144
 Thr Ile Trp Pro Gly Thr Leu Thr Ser Asp Gln Lys Pro Gln Leu Ser
 35 40 45

aaa act gga ttt gag tta gca tcc aaa gca tcc tta aca ttg gaa tgt 192
 Lys Thr Gly Phe Glu Leu Ala Ser Lys Ala Ser Leu Thr Leu Glu Cys
 50 55 60

tca agc tcc atg gaa agg ccg gtt ttg ggc ccg aac ccg atg cac cac 240
 Ser Ser Ser Met Glu Arg Pro Val Leu Gly Pro Asn Pro Met His His
 65 70 75 80

caa atc agg aaa gtt cac ttg cga gac tgc tga ttg tag cac cgg tca 288
 Gln Ile Arg Lys Val His Leu Arg Asp Cys Leu His Arg Ser
 85 90

ggt tgc atg caa tgg taa cgg tgc aat ccc acc agc ttc ttt agt aga 336
 Gly Cys Met Gln Trp Arg Cys Asn Pro Thr Ser Phe Phe Ser Arg
 95 100 105

aat caa cat agc agc caa tcg tgg gat gga cta tta tga tgt tag cct 384
 Asn Gln His Ser Ser Gln Ser Trp Asp Gly Leu Leu Cys Pro
 110 115 120

tgt aga tgg ctt caa ctt gcc tgt ttc tgt agc cac cag agg cgg cac 432
 Cys Arg Trp Leu Gln Leu Ala Cys Phe Cys Ser His Gln Arg Arg His
 125 130 135

tgg tga ttg caa ggc cac aag ctg tcc agc taa tgt gaa cgc agt ttg 480
 Trp Leu Gln Gly His Lys Leu Ser Ser Cys Glu Arg Ser Leu
 140 145 150

ccc agc gga att aca agt gaa agg gtc tga tgg gag cgt gct tgc ttg 528
 Pro Ser Gly Ile Thr Ser Glu Arg Val Trp Glu Arg Ala Cys Leu
 155 160 165

caa gag cgc ttg tat tgc ttt caa tca acc aca gta ctg ttg cac tgg 576
 Gln Glu Arg Leu Tyr Cys Phe Gln Ser Thr Thr Val Leu Leu His Trp
 170 175 180

tgc att taa cac ccc gaa aac atg tcc acc cac aaa ata ttc tgc cat 624
 Cys Ile His Pro Glu Asn Met Ser Thr His Lys Ile Phe Ser His
 185 190 195

ctt taa gca aca atg tcc tca agc tta tag cta tgc tta tga tga tcc 672
 Leu Ala Thr Met Ser Ser Ser Leu Leu Cys Leu Ser
 200 205 210

tac cag cac ctt tac ctg ctc aag tgc acc cga cta tgt tat cgc att 720
 Tyr Gln His Leu Tyr Leu Leu Lys Cys Thr Arg Leu Cys Tyr Arg Ile
 215 220 225

ttg tcc ata aat 732
 Leu Ser Ile Asn
 230

<210> 8

<211> 226

<212> PRT

<213> Castanea sativa

<400> 8

Met Lys Thr Leu Ala Leu Tyr Gly Leu Thr Leu Ala Phe Phe Phe Leu
 1 5 10 15

Ser Gly Ala His Ser Ala Lys Ile Thr Phe Thr Asn Asn Cys Pro Arg
 20 25 30

Thr Ile Trp Pro Gly Thr Leu Thr Ser Asp Gln Lys Pro Gln Leu Ser
 35 40 45

Lys Thr Gly Phe Glu Leu Ala Ser Lys Ala Ser Leu Thr Leu Glu Cys
 50 55 60

Ser Ser Ser Met Glu Arg Pro Val Leu Gly Pro Asn Pro Met His His
 65 70 75 80

Gln Ile Arg Lys Val His Leu Arg Asp Cys His Arg Ser Gly Cys Met Gln
85 90

Trp Arg Cys Asn Pro Thr Ser Phe Phe Ser Arg Asn Gln His Ser Ser Gln
100 105 110

Ser Trp Asp Gly Leu Leu Pro Cys Arg Trp Leu Gln Leu Ala Cys Phe Cys
115 120 125 130

Ser His Gln Arg Arg His Trp Leu Gln Gly His Lys Leu Ser Ser Cys Glu
135 140 145

Arg Ser Leu Pro Ser Gly Ile Thr Ser Glu Arg Val Trp Glu Arg Ala Cys
150 155 160 165

Leu Gln Glu Arg Leu Tyr Cys Phe Gln Ser Thr Thr Val Leu Leu His Trp
170 175 180

Cys Ile His Pro Glu Asn Met Ser Thr His Lys Ile Phe Ser His Leu Ala
185 190 195

Thr Met Ser Ser Ser Leu Ser Tyr Gln His Leu Tyr Leu Leu Lys Cys Thr
200 205 210 215

Arg Leu Cys Tyr Arg Ile Leu Ser Ile Asn
220 225